IN THE CLAIMS

Claim 27 is amended herein. Claims 28 through 44 are cancelled. New claims 45 through 90 are added. All pending claims are reproduced below.

Claims 1-26 are Cancelled

27. (Currently amended) In an optical detection system housing a coherent light source for illuminating a surface, and an optical sensing assembly comprising [[a]] at least one photosensitive array and ~~a plurality of~~ at least one optical ~~elements~~ element, a method for detecting movement comprising:

generating an illumination spot on the surface by lighting the surface with a coherent light beam from the coherent light source, the illumination spot ~~diffusely reflected~~ providing optically back-scattered light off the surface;

arranging ~~the plurality of~~ each optical ~~elements~~ element to pass ~~a diffusely reflected~~ an image of the illumination spot ~~through each optical element~~ onto ~~the~~ each photosensor array associated with an optical element, the photosensor array having a plurality of pixels~~, the diffusely reflected image from at least two optical elements overlapping on a pixel to form an overlapped image~~; and

generating ~~an unambiguous~~ at least one image data signal from ~~the~~ each photosensor array in response to the ~~overlapped~~ image on the ~~pixel~~ plurality of pixels of that photosensor array, each image data signal comprising at least one image data point;

storing a first image data signal;

storing a second image data signal; and

measuring similarility of images through the first image data signal and the second image data signal to obtain a displacement value, the displacement value indicative of detected movement.

28. (Cancelled)

29. (Cancelled)

30. (Cancelled)

31. (Cancelled)

32. (Cancelled)

33. (Cancelled)

34. (Cancelled)

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Cancelled)

39. (Cancelled)

40. (Cancelled)

41. (Cancelled)

42. (Cancelled)

43. (Cancelled)

44. (Cancelled)

45. (New) The method of claim 27 wherein the first image data signal is stored in a first portion of a memory unit and the second image data signal is stored in a second portion of the memory unit.

46. (New) The method of claim 27 wherein the first image data signal is stored in a first portion of a memory unit at a start of operation of the optical detection system and the second image data signal is stored in a second portion of a memory unit for each measurement of the similarity of images.

47. (New) The method of claim 27 wherein the first image data signal comprises a first substantially random image data signal and the second image data signal comprises a second substantially random image data signal.

48. (New) The method of claim 27 wherein the second image data signal is a substantially shifted version of the first image data signal.

49. (New) The method of claim 27 wherein the first image data signal comprises a first speckle image data signal and the second image data signal comprises a second speckle image data signal.

50. (New) The method of claim 47 wherein the similarity of the first image data signal to the second image data signal is measured at a multiple of a shift value, the first image data signal being shifted by a predetermined shift value prior to the measurement.

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51. (New) The method of claim 48 wherein the similarity of the first image data signal to the second image data signal is measured at a multiple of a shift value, the first image data signal being shifted by a predetermined shift value prior to the measurement.

52. (New) The method of claim 49 wherein the similarity of the first image data signal to the second image data signal is measured at a multiple of a shift value, the first image data signal being shifted by a predetermined shift value prior to the measurement.

53. (New) The method of claim 47 wherein the similarity of one set to a plurality of at least two image data signals is measured at a multiple of a shift value, each set comprising a high resolution and a low resolution image data signal, and the image data signal in the first set being shifted by a predetermined shift value prior to the measurement.

54. (New) The method of claim 27 wherein measuring the similarity is performed through an application of a cross correlation function.

55. The method of claim 27 wherein the displacement value comprises identifying a shift to apply to the first image data signal that results in a substantial similarity between the first image shifted by the displacement value and the second image.

56. (New) The method of claim 27 wherein the first image data signal is replaced by the second image data when a displacement value comprises a predetermined value.

57. (New) The method of claim 27 wherein the at least one optical element comprises a lens.

58. (New) The method of claim 27 wherein the at least one optical element comprises a lens and an aperture.

59. (New) The method of claim 27 wherein the coherent light beam from the coherent light source comprises a collimated beam.

60. (New) The method of claim 59 wherein the collimated beam produces the illumination spot on the surface.

61. (New) The method of claim 27 wherein the light source comprises a laser diode.

62. (New) The method of claim 27 wherein the back-scattered light from the surface, passes through the at least one optical element to generate an image of the illumination spot on the pixels of the at least one photosensor array.

63. (New) The method of claim 62 wherein the image is focused on the photosensor array.

64. (New) The method of claim 27 wherein the back-scattered light from the surface, passes through the at least one optical element to generate an image of the illumination spot that is less than or equal to a size of the photosensor array.

65. (New) The method of claim 49 wherein the speckle image associated with at least one of the first speckle image data signal and the second speckle image data signal comprises speckles of a dimension greater than or equal to a pixel dimension.

66. (New) The method of claim 54 wherein performing the cross correlation function further comprises:

multiplying the first image data signal and the second image data signal and summing results of each multiplication operation over each data point.

67. (New) The method of claim 66 wherein the cross correlation of the first image data signal to the second image data signal is measured at a multiplicity of a shift value, the first image data signal being shifted by a predetermined shift value before the cross correlation is measured.

68. (New) The method of claim 67 wherein the displacement value comprises identifying the shift to apply to the first image data signal that results in a substantial cross correlation between the first image shifted by the displacement value and the second image.

69. (New) An optical detection system to identify displacement, the system comprising:

a coherent light source configured to generate an illumination spot on a surface, the illumination spot providing optically back-scattered light off the surface;

at least one photosensitive array, each photosensor array having pixels;

at least one optical element, each optical element associated with a photosensitive array, each optical element configured to pass an image of the illumination spot onto its associated photosensor array to generate at least one image data signal from in response to the image on the pixels of the associated

photosensor array, each image data signal comprising at least one image data points;

a first storage area configured to store a first image data signal;

a second storage area configured to store a second image data signal; and

a comparison module configured to measure a similarity of images through the first image data signal and the second image data signal to obtain a displacement value, each image data signed comprising at least one image data points.

70. (New) The system of claim 69 wherein the first storage area comprises a first portion of a memory unit and the second storage area comprises a second portion of the memory unit.

71. (New) The system of claim 69 wherein the first image data signal comprises a first substantially random image data signal and the second image data signal comprises a second substantially random image data signal.

72. (New) The method of claim 69 wherein the second image data signal is a substantially shifted version of the first image data signal

73. (New) The system of claim 69 wherein the first image data signal comprises a first speckle image data signal and the second image data signal comprises a second speckle image data signal.

74. (New) The system of claim 71, wherein the comparison module comprises a cross correlation module.

75. (New) The system of claim 74 wherein the similarity of one set to a plurality of at least two image data signals is measured at a multiple of a shift value, each set comprising a high resolution and a low resolution image data signal, and the image data signal in the first set being shifted by a predetermined shift value prior to the measurement.

76. (New) The system of claim 74 wherein cross-correlation module applies the cross-correlation function on two sets of two image data signals, each set comprising a high resolution and a low resolution image data signals, and in each set, each of the image data signals being shifted at least a portion of a pixel on a photosensor array.

77. (New) The system of claim 69 wherein the first image data signal comprises a first randomly patterned image data signal and the second image data signal comprises a second randomly patterned image data signal.

78. (New) The system of claim 69 wherein the cross-correlation module applies the cross-correlation function a multiple of a shift value on the first randomly patterned image data signal being shifted by a predetermined shift value from the second randomly patterned image data signal.

79. (New) The system of claim 69 wherein the displacement value comprises an argument of the cross-correlation function at function peaks.

80. (New) The system of claim 69 wherein the first image data signal is replaced by the second image data when the displacement value comprises a predetermined value.

81. (New) The system of claim 69 wherein the at least one optical element comprises a lens.

82. (New) The system of claim 69 wherein the at least one optical element comprises a lens and an aperture.

83. (New) The system of claim 69 wherein the coherent light beam from the coherent light source comprises a collimated beam.

84. (New) The system of claim 83 wherein the collimated beam produces the illumination spot on the surface.

85. (New) The system of claim 69 wherein the coherent light source comprises a laser diode.

86. (New) The system of claim 69 wherein the back-scattered light from the surface, passes through the at least one optical element to generate an image of the illumination spot that is less than or equal to a size of the photosensor array.

87. (New) The system of claim 73 wherein the speckle image associated with at least one of the first speckle image data signal and the second speckle image data signal comprises speckles of a dimension greater than or equal to a dimension of a pixel of the pixels.

88. (New) The system of claims 69 wherein the photosensor array comprises a plurality of photodiode pixels.

89. (New) The system of claim 74 wherein the cross-correlation module is further configured to:

multiply the first image data signal and the second image data signal; and

sum results of each multiplication operation.

90. (New) The system of claim 69, wherein an image data point comprises a digital value representative of a pixel on the photosensor array.